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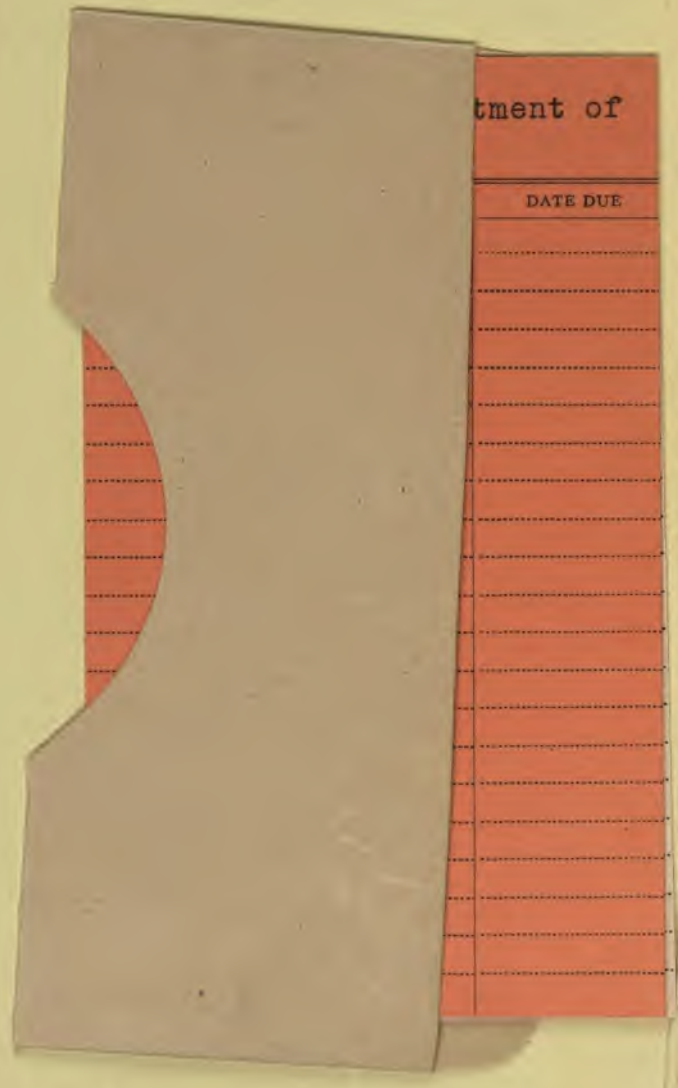

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THE TONIC TREATMENT OF SYPHILIS

BY

E. L. KEYES, A. M., M. D.

Late Professor of Dermatology, Syphilology, and Genito-Urinary Surgery in the Bellevue Hospital Medical College; Consulting Surgeon to the Bellevue Hospital

REVISED EDITION

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PREFACE TO THE SECOND EDITION.

In one sense this essay is a text-book, in that it lays down a course of treatment, rather, I confess it, dogmatically.

In revising it, it is not necessary to add what has been done by every investigator in the field, in order to bring it up to date, because it is a record of original work; it establishes an original theory, and upon this pretence it stands or falls. If it ever was up to date, it is now there, and will always remain there.

In 1876, at the International Congress in Philadelphia, my demonstration of the tonic influence of small doses of mercury was made public. Out of this arose the name "*Tonic Treatment of Syphilis.*"

This name has been wrongly received by the profession. It is alleged that I claim that mercury cures syphilis because it is a tonic. Far from me the thought! Whatever curative influ-

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ence mercury exercises over syphilis is due to its *specific* power over the germ—the virus—and not at all to its tonic influence. I simply claim to have proved that mercury may be so administered as to be a tonic, and not harmful (as it had always before my demonstration been believed to be), and that, by being so used within the bounds of tonicity, it might still, in the long run, conquer the disease; yet not without from time to time being pushed to the *specific* dose.

Other drugs (iron, phosphates, certain bitters) are far more tonic, but they do not on that account cure syphilis.

I hold that mercury in small doses is a tonic, because under its use the general vitality is improved and the number of red blood-cells increased. Whether the latter result is due to an actual increase in number or to a retardation of the destruction of certain cells (their life and usefulness being prolonged, as it has been claimed), is to me, looking at it from the practical side, a matter of not the least importance. The cells are there in greater number than they would have been without the mercury, they do

their work as oxygen-carriers, and the patient feels toned up.

From my standpoint this is tonic action, and I see no reason why I should change my view because Schlesinger,[1] of Göttingen, states that although mercury in small doses increases the number of red blood-cells, yet it is not a tonic because it does not raise the temperature, quicken the pulse, and increase the excretion of urea, as iron does. If it did all these things doubtless it would be more tonic than it is; but that it fails to be at all a tonic because it is not up to this standard, I deny.

An added experience of over twenty years since the treatment was given to the profession has only confirmed my appreciation of its value.

[1] "Experimentelle untersuchungen über die Wirkung lange zeit fort gegebener kleiner dosen Quecksilbers auf Thiere" [am 11. Juni, 1879, von der medicinischen Facultät zu Göttingen gekronte Preisschrift] "Arch. f. exp. Path. und Pharm.," Bd. xiii, Heft v, p. 317, March 22, 1881.

E. L. KEYES.

NEW YORK, *September, 1896.*

PREFACE TO THE FIRST EDITION.

My studies in syphilitic blood have yielded results at once so gratifying to me, and so convincing as to the tonic influence of minute doses of mercury, that I feel impelled to lay this brief treatise before the medical public in support of a continuous treatment of syphilis by small (tonic) doses of mercury. I believe that a general trial of the method will, in the long-run, vindicate its excellence.

I have made free use of facts which I had already published in an article upon "The Effect of Small Doses of Mercury," etc., in the *American Journal of Medical Sciences*, January, 1876; and of other facts used in constructing an argument upon the treatment of syphilis for an essay which I read before the Section on Dermatology and Syphilis, in the International Congress at Philadelphia, in September, 1876.

All the local measures suggested in Chapter

III. have been subjected to repeated tests by me in the venereal wards of the Charity Hospital, as well as in private practice.

In my studies, clinical and experimental, I have received valuable assistance from my friend Dr. L. A. Stimson, and from Dr. Dinslow, of the House Staff of the Charity Hospital.

E. L. KEYES.

210 MADISON AVENUE, NEW YORK, *January*, 1877.

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SYPHILIS.

CHAPTER I.

GENERAL TREATMENT OF SYPHILIS.

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A RATIONAL treatment of syphilis must rest upon a surer foundation than the mere statement of its value made by him who employs it. Such a statement has been made again and again, by different people employing the most varied means against the same evil; and, with apparent justification, for it is well known that a majority of the most visible lesions of syphilis (the cutaneous efflorescences) tend to subside spontaneously, and thus, as Fournier happily expresses it, to afford a triumph to every mode of treatment.

There still exist ardent advocates of syphilization,

of cure by the use of decoctions of woods and roots, of cure by the force of Nature (expectation) in mild cases, of cures by purgation and diuretics, and sweating and tonics. Many cases treated by them undoubtedly get well; but it is equally true that many of them do not, as the instances we occasionally encounter in this country, where one of these methods has been used,[1] go to show. Furthermore, these methods are, all of them, absolutely theoretical — without a pretense of firm foundation in physiological fact. They are essentially empirical, and cannot claim serious attention as rivals to a method based upon the tripod of physiological experiment, inductive reasoning, and clinical observation. Such a method I have been striving for; with what success the profession at large must judge.

On the other hand, amid the great body of practitioners who use mercury and the iodides, the most varied views concerning the proper method of employing these powerful drugs may be found. Nothing like uniformity of opinion exists anywhere. One attempts to produce salivation quickly, another slowly; another to give as much mercury as his patient will hold without becoming salivated. One gives mercury for a very short time, another for a very long time, another in repeated interrupted courses; the courses either coinciding with the outcrop of symptoms, or established without regard to them. The majority use mercury only during the secondary period of the disease, depending upon the iodides later; others commence with

[1] Syphilization by Boeck, of Christiania, in New York, 1869.

the iodides, then take up mercury, and finish with the iodides; finally, some use the iodides throughout, disbelieving in mercury: and so on to the end of the chapter, each advocate of any particular plan believing that his method is the very best of all, and triumphantly referring to his cases (many or few) in justification of his belief.

Is, then, success in the treatment of so chronic and so serious a disease as syphilis the result of chance? Is it indifferent what kind of treatment a syphilitic patient gets? Is it Nature that cures the patient and not the medicine, that so many honest men claim equally good results from methods so radically different?

And what is the justification of all these differing, honest, and ardent advocates? It is the same; that their cases get well, and that a large proportion of them do not suffer relapse. And this universal claim is always based simply upon a certain number of cases.

How, then, shall we reach the truth? Surely all these theories cannot be equally correct, since they differ so much. Truth is absolute and unique, and, if black be black, it is not white, nor even grey.

I have made an earnest effort to solve the problem of the best treatment of syphilis, and I trust I have succeeded, as far as the general treatment is concerned. As to the local measures of treating the lesions, I believe there is still much room for improvement.

I shall first consider the general treatment of syphilis, and then the methods applicable to special types of disease and the local treatment of lesions.

GENERAL TREATMENT.

By general treatment of syphilis I mean such a course as seems best calculated to eradicate the disease, or, at least, to conduct the patient safely through it—a catholic treatment to be followed by all patients, at all times, and everywhere—with some exceptions to be noted.

Before laying down and defending such a course, it is well to inquire whether it is necessary, or even advisable, to subject all cases of syphilis to the same treatment—whether the treatment itself would not sometimes be apt to occasion more harm than a mild attack of the disease left to itself.

On these points I think there can be no doubt, for the double reason that the general treatment I have to propose is in itself tonic, even to a patient in health, much more so when he is syphilitic (as I shall show); and because a case commencing mildly does not necessarily continue to be mild, and may turn out to be a very severe type of disease in later life.

It is a mere exercise of common-sense, applied to clinical observation, to infer that, if a case of syphilis commences mildly, it is more apt to continue mild and be a light case than one which commences severely, and the testimony of most observers has borne out the accuracy of this conclusion. Lancereaux gives his adhesion to it. Diday has gone so far as to formulate a law which he has taught for many years past, and confirmed by new assertions in his last production,[1] that

[1] Diday and Doyon, "Thérapeutique des maladies vénériennes," etc., Paris, 1876, p. 254.

all cases of syphilis commencing mildly (about two-thirds of all) need no mercury, and are better without it.

Indeed, the general notion throughout the profession is that mercury is bad; that is is necessarily harmful, no matter how it is used; and that its employment in the treatment of syphilis is only to be tolerated because the mercury will control the syphilis, and do less harm than the syphilis would have done if unchecked. Hence the physician treats symptoms, and, when they disappear, he tells the patient he is cured and lets him go, stopping treatment. Other lesions appear; they go by the name of relapse, and receive a certain modicum more of treatment, and so on.

Now, if it can be shown, as I hold I have shown, that mercury given in a proper manner is not harmful, but a tonic in health or in disease, provided it can be digested, this demonstration at once establishes the fact that it can do no harm to treat mild cases of syphilis by mercury. And if, on the other hand, it appears that we have no positive means of prognosis, and that certain of the cases of syphilis commencing mildly do turn out in the end to be severe, then it becomes evident that it is wise to treat each and every case from the start by such means as shall have proved themselves competent to hold the disease in check, and at the same time to improve the general condition of the patient, and to maintain him in health during their use.

In my report at Philadelphia to the International Medical Congress in September, 1876, I brought for-

ward upon this head a number of cases to uphold the proposition that a mild beginning in syphilis, untreated or treated in any manner, is not a guarantee that the future course of the malady will be a mild one. I might reproduce those cases here, or cite other analogous ones, but it is unnecessary to occupy space with more proof when enough is at hand.

The proposition is: Some cases of syphilis commencing mildly and treated by any of the ordinary methods, or not treated at all, go badly, and this the cases brought forward in my paper clearly proved. They were all mild cases, and were examples of an early treatment by expectation, by cathartics, by diuretics (balsams), by mercury for a short time in large doses, for a short time in small doses, for a year in fair doses, by homœopathy, by iodide of potassium from the first —yet each and all of them, commencing mildly, became very severe cases of disease.

Fournier has recently recorded forty-seven cases of cerebral syphilis, in only two of which did the disease show any virulence in type at first.

This point, then, must be granted, that syphilis is treacherous and always severe, and that a mild beginning cannot be accepted by the physician as a certain pledge that the malady will continue mild throughout and disappear early.

It remains to show how mercury can be used so that its effect may be tonic and beneficial to the individual taking it; and, finally, that mercury is antidotal to the syphilitic virus in so far as to cause its symptoms

to yield. These points being proved, it becomes very simple logically to make out a course of general treatment which shall be beneficial in all cases.

BRIEF ARGUMENT IN PROOF OF THE TONIC INFLUENCE OF MERCURY.

To determine the influence of mercury, it is necessary to study its effect in small and in large doses upon animals and men—upon the latter, both in health and disease. This I have already endeavored to do in the paper on the "Treatment of Syphilis," already referred to; and in a paper on the "Effect of Small Doses of Mercury," etc., which appeared in the *American Journal of the Medical Sciences*, January, 1876. To these two articles I must refer for many of the steps which have led up to the conclusions now to be advanced.

Mercury, it is well known, has long been considered as an alterative. Alterative action has been variously explained, and Billings[1] came very near the truth in intimating that the alterative effect of mercury was a "tonic" action upon the tissues; but he does not explain his words, or show how or in what mercury is tonic.

The alterative, consisting of a minute dose of bichloride of mercury in compound tincture of bark, which Astley Cooper praised so highly for its efficacy in chronic strumous complaints, and which is largely in use among the profession at the present day, is a monument to the tonic influence of mercury. Its use has

[1] "First Principles of Medicine," fifth edition, 1849, p. 102.

been empirical; its action has been styled alterative; its power of improving the quality of the blood, by increasing the number of its red blood-cells, has not been recognized; but its value as a tonic is proved by the fact that it has long been used, and still is used, with advantage in cases of chronic debilitating disease.

All the older members of the profession in the country whom I have consulted, by word of mouth or by letter, have confessed to a general belief in the value of minute doses of mercury as an alterative in chronic disease. They state that they have received the faith from their preceptors, and have practised upon it without investigating the why or the wherefore of the action of the drug.

Two (at least) prominent authorities in lung-disease, in New York, have used minute doses of mercury, long continued, with advantage in chronic pulmonary disease. The late Valentine Mott was loud in its praises as an "alterative" for strumous children.

Again, I may cite the remedy so long in use among the profession in New York (a minute dose of bichloride of mercury in tincture of iron) as a remedy in Bright's disease—and with some advantage in many cases. This action was also believed to be alterative.

To me the word alterative was always objectionable, because I could not understand it. I believed mercury to be beneficial in minute doses, but it was only while counting with the hématimètre the red cells in the blood of individuals, healthy and syphilitic, who were taking minute doses of mercury, that I appreciated its

real import: alterative, when applied to small doses of mercury, means tonic, and tonic means an increase in the number of the red blood-cells.'

Liègeois, in 1869, announced in the *Gazette des Hôpitaux*, as the result of experiment, that small doses of corrosive sublimate administered to men or to animals caused them to increase in weight; larger doses were debilitating, still larger ones were fatal.

This statement I was at that time prepared to receive, since I had already several years of experience in the long-continued use of minute doses of mercury in syphilis, and had watched many patients slowly improve in weight and strength while under this treatment, in spite of their syphilitic condition. I felt at that time, however, inclined to ascribe my patients' improvement to the counteracting influence of mercury upon the syphilitic virus, and not to an essential tonic influence of the drug.

J. Hughes Bennett, in 1874, in his Report to the Edinburgh Committee of the British Medical Association (second edition), on the action of mercury, etc., gives fourteen carefully-tabulated records of experiments made upon dogs by giving them different forms of mercury in varied doses. The effect of minute doses was not the object of the committee's study, yet a close inspection of the tables yields the following important information, of which the committee did not take note:

Corrosive sublimate, blue-pill, or calomel, was given,

[1] See the second preface of this essay for a criticism upon my application of the word "tonic" to the effect produced by mercury.

but whatever mercurial was used the dog invariably lost weight under large doses, whether the same were continued during a short or a long period. Only twice in the report is any gain in the weight of a dog noted. In both comparatively small doses of corrosive sublimate were employed (one-sixth grain daily to one-third grain twice a day), and when the latter large dose was continued for more than forty-eight hours, in one case, the dog lost about six pounds, while the same dog, suffering from an artificial fistula in the abdomen, had increased in weight over three ounces in four days while taking one-sixth grain corrosive sublimate twice a day, and had held what he gained until the dose was increased (p. 51). The other dog took about four grains of corrosive sublimate in twelve days, and gained about the same amount. All the other dogs received larger doses of mercury, and in each of them where the weight was taken there was a loss.

In 1874 Wilbouchewitch, making use of the microscope and a special instrument for blood-counting, studied the blood of syphilitic hospital-patients who were taking mercury. He concluded from his observations that small doses of mercury at first increased the number of the red cells in the blood, but, if long continued, produced the same results as large doses in animals, namely, a diminution of the red cells, diarrhœa, etc.

It is well known, also, that Grassi and Ricord by chemical methods determined that the use of mercury early in syphilis diminished the amount of the red cells relatively to the whole mass of the blood.

Here, then, was the problem how to reconcile such seemingly conflicting results arrived at from the same premises.

The solution became easy when it was recognized that the premises were not the same. Grassi did not even pretend to use small doses of mercury, but pushed the drug to its toxic effect, and then found that it was debilitating, a result which all must admit.

Wilbouchewitch also overdosed his patients, though to a less degree, and he does not seem to be aware of it, although his patients lost weight and got diarrhœa. Of his ten cases five got over one-half a grain of corrosive sublimate a day, the rest a grain and a half of protiodide—surely in neither case a very small dose for a patient on hospital-diet.

In my own experiments with the hématimètre,[1] using minute doses of mercury upon healthy and upon syphilitic individuals, I think I have proved beyond question that mercury in minute doses is tonic in all cases where it can be digested, in syphilis or out of it, continued for a short or a long (over three years) time.

This method of proof is absolute and scientific. If the number of red cells in the blood increases under the use of a given remedy, that remedy is a tonic. Here is no opportunity to distort facts, no chance for argumentative subterfuge.[2] The instrument may be used, and the results verified or disproved by any one. I consider a wide-spread knowledge of the instrument

[1] Published in the article already referred to. [2] See second preface.

and the method of its use of so much value that I reproduce its description here.

The instrument[1] for blood-counting which I have used is the hématimètre of Hayem and Nachet. Fig. 1 represents all its parts except the microscope.

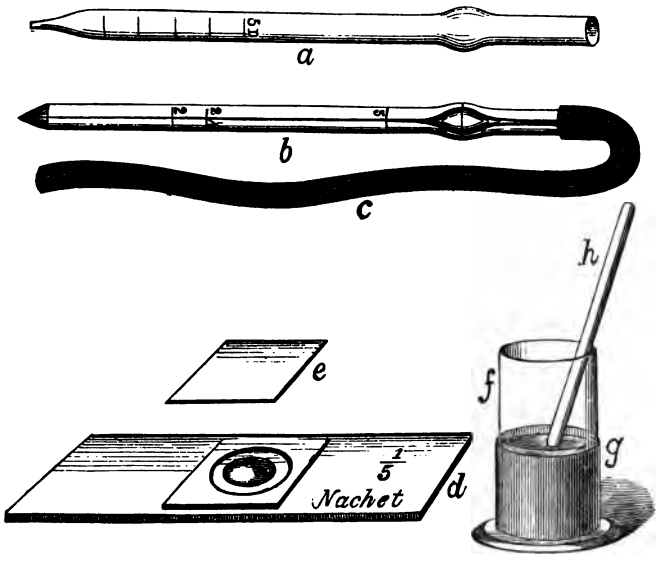

FIG. 1.

a is a graduated glass pipette, each line on the tube marking off a capacity of 100 cubic millimetres, 5 D therefore indicates 500 cubic mm.

b is a smaller capillary pipette, graduated to 2, 2½, and 5 cubic mm.; the operator takes the rubber tube *c* into his mouth to facilitate the entrance of blood into the pipette by suction.

[1] Other methods exist for estimating the amount of red material in the blood. They are much more easily applied, but their description is not essential in this context.

d is a glass slide, upon which is cemented a glass cell with a circular opening 1 centimetre in diameter, the depth of the cell being exactly $\frac{1}{5}$ mm.; *e*, the covering glass to fit over the cell. A drop of fluid is represented in the cell.

f is a small glass cup to receive the blood and artificial serum for mixing. It fits into a brass stand *g*, to insure firmness; *h* is a glass rod with which to mix the fluids.

The apparatus is completed by a microscope having a special eye-piece (No. 2 Nachet) containing a quadrilateral micrometer, as seen projected upon the stage (Fig. 2).

The large square of the micrometer is further di-

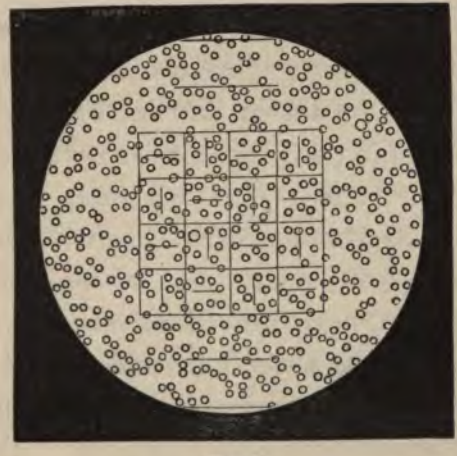

FIG. 2.

vided into sixteen smaller squares, while each smaller square contains a line drawn half-way across it to facilitate the counting.

MANNER OF USING THE INSTRUMENT.

The eye-piece above described being adjusted to a microscope, the draw-tube is so arranged that for a given objective (No. 2 Nachet is suitable) a side of the square micrometer in the eye-piece measures exactly $\frac{1}{5}$ mm. upon a stage micrometer. The depth to which the draw-tube has been pushed in is then scratched upon the tube, so as to be easily arranged in a moment, and the microscope is ready for use.

I have always adopted as a standard of dilution 1 to 250, as this scatters the corpuscles sufficiently to make them easy to count. The actual process is as follows:

The pipette *a* is filled to the mark 5 D with the diluting fluid, which is at once emptied into the glass cup *f*. The pulp of the finger of the patient, whose blood is to be tested, should be deeply pierced with a glover's needle having a triangular cutting-point. The blood should not be driven forward into the finger by pressure before the puncture. A string should not be tied around the finger. A round, sharp needle should not be used. Repeated experiments, with needles and knives upon myself, which lack of space forbids my reproducing here, have proved to me that the above suggestions must be heeded in order to be certain of always obtaining uniform specimens of capillary blood. The triangular cutting-needle does away with Hayem's objections to puncture,[1] and is a less formidable instrument than the knife in the eyes of the patient.

[1] "De la Numération des Globules du Sang," (*Gaz. Hebd.*, May 7, 1875, p. 291).

After piercing the pulp of the finger, quick, firm pressure down the finger will force out a large drop from the puncture. This must be sucked into the capillary pipette without delay, lest it coagulate. When the pipette is full to the mark 2, its point should be rapidly wiped clean of any blood adhering on the outside, and the contents at once blown into the artificial serum in the cup *f*. A little suction, back and forth, clears the tube of any blood-corpuscles which may have adhered to the glass within. Both tubes should be carefully washed before being put away.

The mixture should now be thoroughly agitated with the glass rod, and, before it has time to settle, a drop is placed in the middle of the cell on the slide *d*, care being taken that the drop is not large enough to touch any part of the circumference of the cell (Fig. 1, *d*). The covering-glass, *e*, should be immediately placed upon the cell. Should the drop be too large, so that, when the thin glass is adjusted, it spreads out enough to touch the circumference of the cell and to be partly sucked up beneath the covering-glass and top of the cell, the latter must be wiped and a new drop placed within it. Finally, a small drop of water or saliva is applied to the edge of the covering-glass, under which it circulates around the top of the cell, serving to hold the cover in place and prevent the evaporation of any part of the drop within.

The slide thus prepared is placed under the microscope. In a few moments the counting may begin; the blood-corpuscles will have all settled to the bottom of

the cell, and a picture similar to that shown in Fig. 2 will be seen on looking through the microscope. The counting should not commence until all the corpuscles are upon the same plane and can all be focused together. It is better to count each of the sixteen squares and write down its number separately, so that in counting the square beneath it, should there be any doubt about counting a given corpuscle lying upon the line, a glance at the number recorded for the square above may remove all doubt. Many corpuscles will be found lying upon the outside lines bounding the large square. I have adopted the rule of rejecting all those lying upon the upper and right-hand outside lines (of the large square) and counting all those lying upon the lower and left-hand outside lines.

After having thus obtained the number of red corpuscles situated within the large square, it becomes easy by a simple equation to find the number in a cubic millimetre. A single count, however, exposes to sources of error, and, in order to approach more nearly to exactness, I have uniformly counted the number contained in the large square in five different portions of the field (sometimes ten), and have taken a mean of the whole number of counts as the standard.

The computation is as follows: The glass cell on the slide is $\frac{1}{5}$ mm. deep. The eye-piece micrometer marks off $\frac{1}{5}$ mm. square, therefore the count of red corpuscles (or white, as the case may be) must indicate the number contained (in the dilution used) in $\frac{1}{5}$ mm. cube. But $\frac{1}{5}$ mm. cube is $\frac{1}{125}$th of a cubic mm., there-

fore the number counted must be multiplied by 125; and the blood was diluted by adding 250 parts of fluid to one of blood (2 cubic mm. to 500 cubic mm.), therefore the product above obtained must be again multiplied by 251, to get the number of corpuscles in a cubic mm. of pure blood. Instead of multiplying twice, a single multiplication by the product of 125×251 (31,375) will give the same result.

Letting $x =$ the mean of 5 counts; the equation then is simply: The number of red corpuscles in a cubic mm. of blood $= x \times 31{,}375$.

The fluid which I have found to possess the best qualities as an artificial serum is urine, prepared as follows:

Take of urine, neutral or slightly alkaline, sp. gr 1020, a sufficient quantity, filtered. Add gr. v of corrosive sublimate in powder for each ounce of urine. This will throw down dense clouds of amorphous urates, so fine that ordinary filter-paper will not remove them. After standing, the urates deposit, and the clear fluid above may be easily decanted. Reduce with water to sp. gr. 1020.

The result is a limpid, sparkling, acid fluid which remains clear, no matter how often contaminated with the pipette, and does not seem to allow of the growth of any form of vegetation. It makes a perfect mixture with blood. It bleaches the red corpuscles quickly, and very slightly, but uniformly, increases their size. They retain, however, their flattened, bi-concave, disk-like shape, and do not become dissolved after standing more than twenty-four hours.

The choice of the fluid is the result of a great number of tentative experiments. It possesses all the necessary qualities. It does not putrefy, bacteria cannot develop in it, nor round-celled vegetable growths—the presence of either of which is fatal to the usefulness of a diluting fluid.

With this instrument up to November, 1875, I had counted more than five hundred times the blood of twenty-one syphilitic and six healthy persons. From these my report was made out. The conclusions reached at that time have been repeatedly verified since by numerous examinations of the blood of other persons. I quote the conclusions in full:

1. 5,000,000 red blood-corpuscles in the cubic mm. is a full, high average for the adult healthy male. Anæmia very rarely goes below 3,000,000; fine conditions of physical health reach above 6,000,000. In ordinary seasons, in the city, 4,500,000 would indicate a fair state of health.

2. Mercury decreases the number of the red cells when given in excess, especially in hospitals (Wilbouchewitch).

3. Syphilis diminishes the number of red corpuscles below the healthy standard.

4. Mercury in small doses continued for a short or long period in syphilis, alone or with the iodide of potassium, increases the number of red corpuscles in the blood, and maintains a high standard of the same.

5. Mercury in small doses acts as a tonic upon healthy animals, increasing their weight (Liègeois, Ben-

nett's report, above referred to). In larger doses it is debilitating or fatal.

6. Mercury in small doses is a tonic (for a time at least, as long as the experiments lasted) to individuals in fair health, not syphilitic. In such individuals, it increases the number of the red blood-corpuscles.

Counting the white corpuscles I have found unsatisfactory. Their number is constantly varying from causes which have nothing to do with a prolonged chronic disease. A four-per-cent. solution in water of chloral tinged to a rich bluish purple by methyl aniline, makes it very easy to count them. The red cells are mainly dissolved or heaped into transparent clusters by such a solution, while the white cells remain unaltered and of a rich blue tint. I used a larger field than $\frac{1}{5}$ mm. and made many counts of white cells, but recognized so many sources of error that I gave up the search as unreliable and unprofitable.

I have also studied the effect of the administration of iodide of potassium[1] upon the blood in syphilis, early and late in the disease.

The iodides certainly are tonic, and increase the number of the red cells. In syphilis they do this to a greater degree than mercury does. During the investigation, however, it turned out that while iodide of potassium given early in syphilis increases the number of the red cells more rapidly than does mercury given under similar circumstances (for the increase is apt to

[1] And received in all these researches great assistance from my friend Dr. L. A. Stimson.

be light at first when the depressing influence of syphilis begins to blight the patient's vitality), yet the syphilitic symptoms appear none the less, and are not so much modified and delayed as they are by the seemingly less tonic influence of mercury.

Hence it appears that Grassi was only measurably wrong, and wrong by omission, for mercury (in excess) indeed does diminish the number of the red cells in the blood of syphilitics, both early and late in the disease, and iodide of potassium in moderation or in excess (within limits) does increase the number of the red cells early and late in syphilis; but the hématimètre shows, what Grassi did not discover, that mercury in minute doses in early syphilis as well as in late syphilis and in health, increases the number of the red blood-cells, and maintains a high average of the same.

Having now shown that mercury is tonic, and not in itself harmful to the individual, even where it is taken continually for long periods,[1] it remains only to prove that mercury is at all useful in syphilis, and at what times.

That mercury is useful in controlling the symptoms of syphilis I think is conceded by every one. Nearly all physicians employ it for this purpose, and daily clinical experience justifies the conclusion that mercury is antagonistic to many (it might even be said to all) symptoms of the disease; for the reports of cases where the most varied lesions, even gummata, have yielded to its influence, abound in the journals of the day. Over

[1] In two cases in my report the period exceeded three years.

gummata mercury has the least power, the different preparations of iodine being unquestionably of greater value in this field.

Mercury, indeed, needs hardly to be defended as being best able to overcome the symptoms of syphilis, for even the enemies of the drug allow this; their claim being that the mercury, although subduing the symptoms, harms the patient, produces tertiary disease, etc.

Not only has it been demonstrated by clinical experience that mercury, given by the mouth, controls syphilitic symptoms, but its power, when applied locally, is equally evident, as has been shown by Hebra, Ch. Hunter, Koebner, Monti, and others, by the local effect of the subcutaneous injections of mercury. The advantage of local mercurial dressings of syphilitic lesions has been long established.

That mercury is useful late in syphilis, as well as early, is proved by the well-known value of the mercurial vapor-bath for many forms of ulcerative lesion, occurring late in the disease; by those cases of severe nervous syphilis where the symptoms are reported to yield when the gums become touched; by certain cases of tertiary disease, where mercury cures after iodide of potassium has failed, of which I have seen and reported examples.

Mercury certainly carries the palm in inherited syphilis, the mixed symptoms of this form of disease yielding more certainly to mercurial inunction, as a rule, than to any other means.

THE IODIDES.

The preparations of iodine are of value—a certain value, doubtless, as a tonic—throughout, in the treatment of syphilis. The number of the red blood-cells increases under their administration; but as anti-syphilitics proper the preparations of iodine have very little worth—they do not keep off the earlier eruptions, or prevent relapse. In cases of gummy tumor, on the other hand, wherever situated, for all sorts of brain-lesions, for all kinds of nervous symptoms, all visceral lesions where gummatous change of stroma is involved, for many forms of ulcers and inveterate cutaneous lesions, the preparations of iodine hold the very first rank in value, and their skilful use yields marvelous results.

In certain connective-tissue lesions of the deeper organs (one of the forms of syphilitic orchitis) and many chronic skin-affections, a combination of mercury with iodine, in what is known as the mixed treatment, gives the best results.

My object, in what has been written, has been to show that—1. Mercury is generally recognized as capable of overcoming the symptoms of syphilis and postponing their appearance; 2. Mercury in minute doses, long continued, is tonic.

Before going into a detail of the steps of treatment I have only to add that I have now for many years carried out the plan of treating syphilis by the long-continued, unremitting use of small doses of mercury.

This I did, before I ever heard of the hématimètre, under the instruction and advice of my preceptor and partner, Prof. Van Buren. Some years ago we jointly published our views on this subject. Since then I have been at work upon the problem, and think I have established a firm scientific justification of the treatment, which had before very amply justified itself clinically. Of late years I have been using smaller and smaller doses of mercury, and continuing their use for longer and longer periods, and feel satisfied that this has been a step in the right direction.[1] I have also been using the iodides less, except in certain selected cases, where I believe they must be pushed unsparingly.

My experience leads me to state that syphilis, in private practice, is a very manageable disease; that a patient rarely has more than one full, general eruption (the first), during which his treatment was commenced. That subsequent lesions are of a trifling character for the most part, and tertiary symptoms very rare. I rarely see iritis, and not often any appreciable loss of the hair. Mucous patches about the mouth and tongue, and throat-symptoms, are often very obstinate. I am now in the habit of keeping patients two and a half or three years under treatment continuously, and then I see them marry and produce healthy children.

The bad cases of syphilis I meet have generally been overtreated or undertreated early in the disease,

[1] At this date (1897) the pendulum swings back again. I have ceased of late diminishing the dose and prolonging the course, and rather tend to come back honestly to the old "tonic dose."

and have not pursued a regular systematic, continued course.

I think the method I shall now proceed to lay down in detail will succeed as well in the hands of others as it does in mine, provided it be carried out with conscientious exactness, and be persisted in with long-suffering patience by the physician as well as by the patient.

CHAPTER II.

DETAILS OF GENERAL TREATMENT.

When to commence General Treatment.—Details of the Continuous Tonic Treatment by Mercury.—The Tonic Dose; the Full Dose; the Reserve Dose.—The Duration of General Treatment.—Inunction; Subcutaneous Injection; Mercurial Vapor-Bath.—Treatment of Salivation.—Preparations of Iodine and their Use in Syphilis.—Mixed Treatment.—Limit to the Dose of the Iodides.—Duration of Treatment by Iodine.—Other Means used in General Treatment: the Woods, Zittman's Decoction, Syphilization, Hot Springs of Arkansas.—Treatment of Pregnant Women.—Treatment of Inherited Disease.

THE diagnosis of syphilis must be established beyond question before treatment is commenced. The general treatment should last during at least two years, and is not to be undertaken lightly. A chancre is not enough to convict a patient, even if it be single, very hard, of apparently long incubation, and attended by indurated, multiple inguinal ganglia, etc. In such a case, if confrontation establish the source of the contagion to have been true syphilis, treatment may be commenced, otherwise it is wiser and as well in the end for the patient to wait until the early eruption has come to confirm the diagnosis, and then to commence the administration of mercury. Meanwhile, if something must be done to satisfy the patient, a little iodide of potassium or sodium may be given, for this is tonic, can do no harm, may do a little good, and cannot prevent the appear-

ance of the first eruption, which will come to confirm the diagnosis if syphilis be present.

When the post-cervical or epitrochlear glands begin to indurate, or the early eruption begins to show, then all temporizing may be abandoned and the serious work of prolonged treatment honestly entered upon.

Any preparation of mercury may be used. I prefer the French granules of the protiodide (made by Garnier and Lamoureux)[1] containing one centigramme each. They do not alter by time or climate, are always reliable, and do not irritate the intestines as much as the American granules of the (chemically pure yellow) protiodide. They may be conveniently carried in the pocket, and taken without exciting notice. Some patients do better under the yellow American protiodide granules.

If these sugar-coated granules are not to be had, the following may supply their place:

℞. Hydrargyri protiodidi, gr. xx.
Tragacanthæ, q. s. argent.
Make into 120 small pills, one-sixth of a grain each.

In some irritable conditions of the intestine the protiodide disagrees, causing pain, diarrhœa, etc., even when given in minute doses; under such circumstances one-grain grey-powder tablets may be substituted, or the following pills:

℞. Mas. hydrarg., gr. l.
Make into 100 pills.

[1] There is sold an alleged G. & L. granule which Fougera & Co. (G. & L. agent) believe to be spurious. It has a white-sugar centre, being made on the nonpareil machine, and is often quite irritating to the intestine. The true G. & L. granule has no sugar centre.

Or, if the patient be anæmic, the following:

℞. Mas. hydrarg.,
Ferri sulph. exsic., āā gr. l.
Extr. gentian, q. s.
Make into 100 pills.

Or, one-fiftieth of a grain mercuric bichloride tablets or granules.

Where the patient cannot or will not take pills, the following are good combinations to be given, largely diluted, after eating:

℞. Hydrarg. bichlorid., gr. j.
Tr. cinchon. co.,
Aquæ, āā ℥ iij.
M. Teaspoonful dose.

Or—

℞. Hydrarg. bichlorid., gr. j.
Tr. ferri sesquichlorid., ʒ iij.
Aquæ, *ad* ℥ vj.
M. Teaspoonful dose.

Or any other combination, solid or liquid, containing in each dose only a minute portion of mercury. Liquids are more difficult to manage, and are less convenient to use in the effort to find the patient's "dose," his "tonic dose," which cannot be predicted beforehand.

Having decided which of the above preparations to employ (each of them is to be managed in the same manner), the patient should in all cases be prepared, hygienically, for mercury.

He should be sent to the dentist, if necessary, to have his mouth put in order and the tartar cleared from his teeth; tobacco in every form should be cut off, for nothing so conduces to persistent trouble in the mouth and throat as the use of tobacco. He should be

impressed with the necessity of being very regular in all his habits, instructed in a rational diet, and told to avoid all indigestible food and much fruit, at least until his tonic dose is ascertained. He should avoid all depressing influences, physical or mental. Thus prepared, he is ready to commence treatment.

Supposing that the centigramme granule has been selected as the medicine to be used, the instructions to the patient are as follows:

Take one granule immediately after each meal (i. e., three times a day), during three days.

On the fourth day add one granule to the mid-day dose—taking one in the morning, two at noon, one at night. Continue this during three days.

Again, on the fourth day add one granule—two in the morning, one at noon, two at night. Continue this during three days.

Again, on the fourth day add one granule—two in the morning, noon, and night. Continue this for three days, and again on the fourth add a granule.[1]

Continue in this manner, being very careful as to food, drink, exposure, etc., until there is very positive evidence of irritation in the intestine, such as colicky pains, with positive diarrhœa, or until the gums begin to show signs of being lightly touched.

The daily amount now taken is known to be the patient's dose of the given preparation of mercury, be-

[1] If time presses, each third day may be selected to increase the dose upon, or, what is better, a mercurial vapor-bath every fourth day, or an intramuscular mercurial injection, the internal dose being increased as usual.

yond which he cannot go, without aid from opiates, and of which, if long maintained, the effect upon the general health will be certainly damaging.

This amount, whatever it may be, I call the patient's "FULL DOSE," in contradistinction to his "TONIC DOSE."

It is impossible to find what the full dose of a patient is, except by experiment. I have met patients whose full dose was three or four granules a day—and occasionally some one who did not seem to be able to take the protiodide of mercury at all—while other patients will take five granules at a dose three times a day, and sometimes even more, before the "full dose" is reached. One patient took forty-five granules a day.

In finding the full dose, many days may be required, and, if the patient is already covered with a general spreading eruption when the treatment is commenced, he may not be willing to wait quietly for his full dose to be reached.

Under these circumstances, a mercurial vapor-bath may be given (p. 36) twice a week, or an injection or inunction (p. 45) practised daily, in addition to the internal treatment, which latter should be steadily pushed until the "full dose" is reached. This dose is now to be maintained while the adjuvant (bath or inunction) is dropped, after which it may be necessary to go a little higher to reach the exact "full dose;" or the latter may be found after the baths or injections shall have quieted the eruption.

The "full dose" being ascertained, it may be con-

tinued by the aid of opiates and unirritating food until the eruption or the syphilitic symptoms, whatever they may be, have been overcome. It is not necessary to keep up the full dose for the treatment of mucous patches. The "tonic dose" and local treatment are more suitable for the management of these lesions.

As soon, then, as the active symptoms have yielded, the patient's dose is reduced one-half, and this half-dose, which will act as a tonic (I call it the "tonic dose"), is to be continued unceasingly day after day, month after month, waiting for new symptoms. Should such symptoms appear (there may be none whatever, except throat and mouth lesions), the half-dose held in reserve (I call it the "reserve dose") may be at once added to the "tonic dose" and the "full dose" continued until the symptoms yield, after which the "tonic dose" is to be again resumed; or, as in the first instance, the aid of inunction or bath or mercurial injection may be invoked to assist the "tonic dose" and dissipate the symptom.

The above is the essence of general treatment. Each case demands its own special study to decide what it may require besides the regular course. Tonics and change of air and variations in food, alterations in clothing, etc., may be called for in particular cases, and nothing in the general course prevents the patient from receiving full attention in all these particulars. The general hygiene of the skin calls for especial care; bathing and dry frictions, etc., are serviceable. Should an indigestion come on during the course, or any acute intercurrent malady, all treatment may be suspended

temporarily, without apparent detriment to the patient. A variation in the particular form of mercury employed during the course is not desirable, because it is impossible to decide exactly what the tonic dose of the new preparation is without another series of experiments, and the patient may be injured by the change.

In the treatment of syphilis it is hard to conceive a condition in which it is necessary to produce salivation. With the mercurial vapor-bath as an adjuvant to the internal treatment, the patient can be promptly brought to his point of tolerance as to mercury, and a more profound effect produced upon him by bringing him just up to where the mouth begins to show the mercury, than by producing positive salivation in the ordinary way.

In some cases salivation undoubtedly is attended by a marked improvement in the symptoms, but it is questionable whether the same result might not have been attained by other means less harmful in themselves. The great fact is, as far as my experience goes, that patients treated from the first with small doses of mercury continuously do not get into such serious conditions of severe or inveterate disease as to require harsh measures, with some very rare exceptions.

THE DURATION OF THE GENERAL TREATMENT.

I do not consider that a patient is safe in suspending his mild, continuous mercurial course until after at least two years. I generally insist upon two and a half years, and often upon three or more. I do not feel that

justice has been done the patient until at least two good years of treatment lie behind him, and at least six months of entire exemption from any symptom due to syphilis—even the mucous patch.

It is impossible to hold all patients to this rigorous course, but the course is so mild, the patient so little inconvenienced by it, and his health usually so good while following it, that more are induced to follow it on the ground of common sense alone than would seem at first sight probable. I have had patients ask me to allow them to continue the course after the two and a half years had expired, and they had long been free from any evidence of syphilis, because "they had never been so well before in their lives."

I must not be understood, however, to say that all patients get absolutely well by this treatment. On the contrary, many of them have occasional mild symptoms after their course has been suspended, especially in the mouth, if they smoke or chew tobacco. But these symptoms, as a rule, seem to be mild, although tenacious, and to require local measures and mixed treatment for their removal. Serious later troubles—bone, nerve, and visceral lesions—although they occasionally occur, are decidedly exceptional in those who have conscientiously followed the mild, continuous treatment from the first.

INUNCTION.

Inunction is a valuable aid to general treatment. Its use is restricted to interrupted courses in the adult, for it is a dirty method at best, and it is hard to get

clean people to follow it conscientiously for any prolonged period.

I use it mainly as an adjuvant to the general treatment, where I want to decidedly intensify the mercurial action for a time, or to obtain its searching effect for deep-seated lesions, notably in late syphilis.

The absorptive power of the skin varies in different individuals, so that no fixed inunction dose can be stated. The irritability of the skin also varies greatly with the individual. The mercurial eczema (so called) is produced with great ease in some patients, while others will wear a patch of mercurial ointment in contact with the skin for weeks without having the integument even reddened thereby.

Inunction may be very well performed by the patient himself, if he be intelligent. I generally order a given quantity of the ointment or oleate, as the case may be, and instruct the druggist to put into a separate box or bottle the quantity prescribed as proper for a single inunction, as a gauge for the patient to go by. I instruct the patient to take from his large box or bottle a portion about as great as that specially measured out for him, keeping the test-dose to measure the others by. The patient should be instructed to use the ends of the fingers, or even the whole hand, in rubbing in the required amount of ointment. One inunction a day is generally ample. The spot anointed should be patiently rubbed during from twenty minutes to half an hour, then wrapped up in dry flannel without being washed for twenty-four hours, after which the spot should be

washed clean with soap and warm water. A different spot is chosen for inunction each night. If a prompt effect is desired, two inunctions may be practised daily. When ordinary mercurial ointment is used, the flexuses of the joints where the skin is soft are preferred. In such a case the axilla, elbow, groin, and popliteal region, first of one and then of the other side, are employed (if the dose be small in both at a time), so that each region may have several days' rest between the different inunctions. The oleate of mercury may be rubbed over any part of the body indifferently, separate spots being, of course, selected for each inunction.

The preparations best adapted for inunction are mercurial ointment and the oleates of mercury. The former is cheap, dirty, and more irritating to the skin than the latter, but its cheapness renders it valuable. The dose for a single inunction is about one drachm. Less might be used to commence with, and the dose later increased, watching the effect. Soft capsules containing two and a half and five grammes of ointment are now manufactured.

The oleate of mercury is the peroxide of mercury, chemically combined with oleic acid. It is found in the shops of three strengths, but may be diluted at will. The strengths are twenty, ten, and five per cent. The last resembles linseed-oil; the first is thick, pasty, yellowish. The disagreeable odor may be overcome by adding a few drops of oil of roses.

The integument of most people will bear the daily inunction of five per cent. oleate upon the same spot

without showing any irritation. The twenty-per-cent. oleate does irritate the skin. It seems, however, to be much more readily absorbed than mercurial ointment, and in smaller quantities to produce a greater effect. The twenty-per-cent. oleate is preferable for inunction in the adult, using the same precautions as are taken with ordinary mercurial ointment. It is well to commence with half a drachm, and increase. On the whole, I prefer mercurial ointment.

Should mercurial eczema occur, the spot involved should be carefully washed to remove all mercury, and afterward dressed with some soothing ointment (*diachylon*, oxide of zinc, or vaseline) until the irritation subsides; this may require considerable time.

A modified method of inunction, which is much more convenient than the process above described, but not so prompt generally or sure in its action, is to spread thickly, upon a broad band of hard, thick muslin, a patch of about the size of the hand, of mercurial ointment, or twenty-per-cent. oleate. A piece of oil-silk covers the outside of the bandage, and the latter is wrapped around the arm, forearm, thigh, leg, or waist, attached to the clothing so as to remain in place, and is left in position a week or more, if the skin will tolerate it. The patch must be raised daily and the integument inspected. Itching at the edge of the patch, or redness beneath it, means that the skin is beginning to get into trouble, and the bandage must be removed to another place, while the skin is washed and dusted with talcum-powder.

The most efficient inunction method with which I am familiar is that employed at the Hot Springs of Arkansas. I resort to it always when, in grave conditions of late syphilis, I wish to produce a profound mercurial effect, or desire to touch the gums promptly.

The patient, naked from the waist up, sits astride a chair, leaning the breast against the back of the chair. The ointment, squeezed from a five-gramme capsule, is smeared over the entire back. A strong attendant uses the flat of the entire hand in broad, vigorous sweeps in an oval manner, up and down and around the back, during a space of fully twenty minutes, until the blue ointment, passing through shades of green, grey, and greasy white, disappears into the skin. Then the patient puts on a gauze under-shirt beneath his ordinary clothing and goes about his business. Twenty-two hours later the attendant gives the patient a very hot soap-and-water bath, then an alcohol rub, clean clothing, and two hours later repeats the mercurial inunction, putting on the same gauze "mercurial" shirt afterward.

This daily course is persisted in until the blue line at the gums, or mercurial diarrhœa, indicates saturation.

INTRAMUSCULAR INJECTION.

The whole aspect of the subcutaneous injection of mercury has altered of late years on account of improvements in the method. These I need not detail, as this essay is not historical. My own experimenting has resulted in the adoption of the following formula:

℞.	Hydrarg. salicylat.,	gr. xxiv.
	Benzoinol,	ʒ j.
	M.	

This I keep always upon my table, in a wide-mouthed one-ounce bottle. It is always ready for immediate use, and never deteriorates. The salicylate of mercury does not dissolve, but settles as a dirty, pinkish-white deposit at the bottom of the benzoinol. A little active shaking diffuses this sediment evenly through the benzoinol, and this fluid is thick enough to hold it in suspense long enough for all purposes. I use a veterinary hypodermic syringe with a rather large-calibred needle made expressly for the purpose, and one and one-quarter inch long. Thirty minims (marked on the glass syringe) is a fair dose, one and one-half grain of the mercurial salt, and this should be placed in the usual position, the needle being plunged rapidly up to its hilt into the upper lateral region of the buttock.

No previous sterilization or special antisepsis is needed, only decent cleanliness. Several years' experience and an untold number of injections allow me to say that this method practically never yields an abscess. I have given three injections a week, but this usually salivates in the second week. Two a week is active treatment, one a week will do for many cases. The pain, generally moderate, sometimes absent, is occasionally intense for twenty-four hours. I know of no method so far-reaching, when mercury is indicated, as this one. I greatly prefer it to inunction, and use it constantly.

MERCURIAL VAPOR-BATH.

Mercury enters the body more kindly and more promptly in the form of vapor than in any other manner. If a prompt and positive effect of the drug is needed, especially when the stomach is delicate, nothing can take its place. The indications for its use are conditions of outcropping eruption, ulcerated and pustular lesions whether recent or long-standing, the sudden appearance of serious symptoms threatening important organs or functions, and all conditions requiring mercury in anything beyond the "tonic dose," when the patient is debilitated, anæmic, or possessed of an irritable stomach.

In cities where there is a respectable medical bathing-establishment, when the patient is in a condition to walk out, the best plan is to send him to take his bath as often as may be necessary, meanwhile continuing his internal treatment. The best form of bath in these establishments is the following:

Preferably about two hours after a meal the patient undresses, and enters a small closed chamber, provided with a seat, for the sake of comfort, and a small, curtained side-window for outside air, which he may breathe when he desires to do so. A small amount of steam is let into the chamber, enough to dampen the body (without inducing perspiration), and to raise the temperature of the air in the chamber to about 90° Fahr. Then the mercurial, which has been selected, is volatilized in the chamber, the patient breathing the fumes which come into contact with the whole body. The

entire bath should not occupy more than twenty minutes, and if any sensation of faintness or oppression comes on before that time, it is better to stop the bath at once. After the fumigation is over, the patient should be wrapped up in a blanket and lie down until he is thoroughly cooled off (a half-hour generally suffices), when he may dress, without any rubbing or drying, and go about his business. This I believe to be the best form of bath. The best substance to be volatilized I find to be the black oxide of mercury, commencing at one, and running rapidly up to a two-drachm dose or more. Calomel is often used. It is exceedingly efficacious, but has the disadvantage of being irritating to the fauces in some patients, while in others (a great majority) it does not produce this effect. When it is irritating, it causes violent paroxysms of coughing. These come on sometimes while the patient is inhaling the fumes, at others no immediate effect is produced, but afterward, perhaps after half an hour, a prolonged paroxysm of violent coughing may come on, which is sometimes quite distressing and difficult to control. In public bathing-establishments, instead of the closed chamber, there is sometimes a sort of large box, into which the patient enters, and (sitting) has the top closed in such a manner as to leave the head outside, the steam, etc., being arranged as in the closed chamber already described. These chambers are also used for sulphur-fumigations. In this form of bath, which some patients prefer, calomel may always be used, or cinnabar, which has long been employed in fumigation, as the

fumes do not reach the mouth and nose. The dose of calomel, or cinnabar, for such a bath, is one drachm or more; time, twenty minutes.

If a feeling of debility follows the bath, it should not be repeated for several days; but in urgent cases, and where they are well borne, the baths may be taken with advantage every other day, and in many cases I have given them daily with surprisingly good effect. They exert a marked influence, however, when given for a time at the rate of only two a week.

Where a public bath is inaccessible or objectionable to the patient, the process may be carried on without much trouble, and with the least possible expense, at home. The only special machinery required is a sheet of tin, with its edges bent down so that it forms a table, upon which the mercurial to be volatilized is placed. Beneath this a tin lamp, burning alcohol, completes the apparatus.

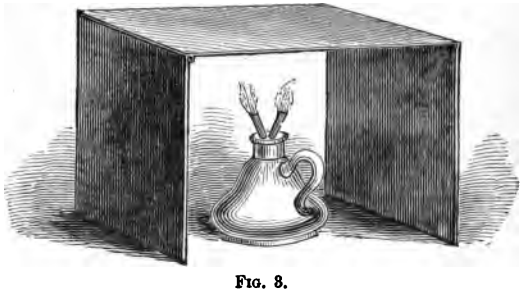

FIG. 8.

To take a bath, the patient sits naked upon a cane-bottomed chair. Two blankets are thrown around the patient and chair together, and are tucked snugly under the chin of the former. A pan of steaming, boiling

water is now placed under the chair. The steam from this in a couple of minutes moistens the skin sufficiently, and if the spirit-lamp be lighted, and the little tin table with its dose of mercury be placed in position over it, also under the chair, two minutes after the pan of water, the skin will be in condition for the mercurial fumes by the time the latter begin to be freely evolved. The patient sits quietly in this bath until the mercurial has been all volatilized (when the lamp may be removed), and for some minutes afterward, in all perhaps twenty minutes. Then, wrapping the inside blanket around him, he lies down and remains quiet until he is cool and ready for bed. Such a bath may be taken nightly or less often, as the necessities of the case and strength of the patient dictate. The effect of the bath may be enhanced by a little inhalation of the mercurial vapor. By so arranging the blankets that they may be opened slightly in front of the chest, the patient may take a whiff of the fumes when it pleases him. Calomel or cinnabar may be used, and, should their fumes prove irritating to the bronchial membranes, they need not be inhaled. Should they not prove irritating on one trial, they may be afterward inhaled with impunity.

The best substance to use in this form of bath is calomel. Black oxide of mercury does not volatilize readily enough by the heat of a spirit-lamp. Cinnabar is allowable, but smells badly. A lamp with one good-sized wick will volatilize from a tin table, of calomel, thirty grains in four and a half minutes; of cinnabar, thirty grains in six minutes.

The cinnabar-fumes are those of burning sulphur, and more apt to irritate the fauces than those of calomel.

The dose of calomel is from thirty grains up to a drachm and more. A larger dose of cinnabar may be used.

The mercurial bath is slow to salivate. It sometimes produces mercurial tremors without salivation. Its effect is prompt, though mild.

TREATMENT OF SALIVATION.

Salivation may occur by accident or design. To guard against it the teeth should be kept free of tartar (by the dentist). A soft tooth-brush should be often used with some alkaline (perhaps astringent as well) tooth-powder or wash. Such compounds as the following are good specimens of what is wanted. They are all agreeable to the taste:

℞.	Pulv. saponis,	gr. xx.–℥ ss.
	" myrthæ,	℥ ss.
	" cinchonæ,	℥ ss.–℥ j.
	" iridis florent.,	ʒ ss.
	Cretæ preparat.,	℥ xj.
	Ol. ros.-geran.,	q. s.
	M.	
	Sassafras or winter-green oil may be used instead of the rose-geranium.	

Or—

℞.	Alumini,	℥ j.
	Tr. krameriæ,	ʒ ss.
	Aquæ gaultheriæ,	ʒ iv.
	M.	

Or—

℞.	Extr. krameriæ,	℥ j.
	Aluminis,	℥ j.
	Aquæ rosæ,	ʒ iv.
	M.	

The use of chlorate of potash during a mercurial course allows a greater quantity of the mercurial to be administered without producing salivation.

℞. Potass. chlorat., ℈iv
Aquæ menth. pip.,
Syr. simpl., āā ℥ ij.
M. S. Teaspoonful in water every two hours.

The approach of salivation is heralded by certain symptoms. The breath acquires a peculiar flat, foul odor, called the mercurial fetor, which is very characteristic. It commences mildly before salivation, and persists with increasing intensity through the duration of the latter. The tongue gets coated. The mouth tastes constantly of copper (as the patient puts it), and is particularly disagreeable upon waking in the morning. The secretion of saliva increases. The gums get redder than usual, especially at the necks of the teeth.

All these signs forerun actual salivation. When they are present, the mouth is said to be "touched," and the prudent physician, looking out for these signs, can generally avoid actual salivation by making his patient cease his mercury and take a drachm and a half (about) of chlorate of potash in solution daily, together with frequent warm baths.

In actual salivation all the symptoms already detailed are much intensified. The tongue swells, and it, with the lips and sides of the cheek, may ulcerate; the gums sometimes show a purplish line along the necks of the teeth; they become spongy and fungous, bleeding at the lightest touch. The teeth loosen and project

from their sockets; portions of the jaw may necrose; meanwhile, pints of saliva are daily dribbling through the swollen lips.

In full salivation, an excellent remedy is the subcutaneous injection of sulphate of atropine:

℞. Atropiæ sulph., gr. j.
Aquæ destill., ʒ j.
M. S. Five minims subcutaneously.

About one-hundredth of a grain is enough to give at a time. The dose may be repeated several times a day, watching the effect upon the pupils. The salivary flow is generally a little influenced by this means.

Of course, all mercury is to be stopped. Warm baths should be ordered. A mild alkaline diuretic is given:

℞. Potassæ citratis, ʒ j.
Aquæ, ʒ iv.
M. S. Teaspoonful in a little water four times a day.

Chlorate of potash, in a solution of a drachm to the pint, may be used as a constant mouth-wash, and from one to two drachms of chlorate of potash in solution taken into the stomach daily. An astringent mouth-wash is often of service:

℞. Pulv. aluminis, gr. xx–3 j.
Sodæ biboratis,
Aquæ, āā ʒ viij.
M.

Or—

℞. Acid. tannic., ℈j–3 j.
Mellis, ʒ ij.
Aquæ, ʒ vj.
M.

Or—

℞. Tr. myrrhæ, ʒ j – ℥ ss.
Aquæ gaultheriæ, *ad* ℥ viij.
M.

Where disinfection is required, one grain of permanganate of potash in an ounce of water, or a half of a one-per-cent. solution of carbolic acid, or a teaspoonful of Labarraque solution in a glass of water may be used as a constant mouth-wash.

The patient should be restricted to a milk-diet, or to very soft articles of food.

PREPARATIONS OF IODINE AND THEIR USE IN SYPHILIS.

Iodine and its preparations rank next in value to mercury in the treatment of syphilis. They always act as tonics when they are well digested; but most of them are irritating to certain stomachs. As tonics, the iodides are useful in any stage of syphilis, but not more so, I believe, than other tonics which are less liable to prove irritating to the stomach by prolonged use. As curative agents of syphilis, the iodides have but little power, even over symptoms in early syphilis, for their use does not seem to shorten the outcrops of eruption very materially or to prevent relapse.

In certain conditions of late secondary eruption, however, especially those which remain obstinately chronic in aggregated groups—scaly and tuberculated spots, chronic pustular patches, serpiginous ulcers—and in all conditions of visceral syphilis, whether gummy or otherwise, the preparations of iodine used along with

mercury (mixed treatment) greatly enhance the value of the latter, sometimes even outrank it in power.

When the lesion is purely gummy, no matter where situated, whether ulcerated or not, and, as a general rule, in all syphilis of the brain, cord, nerves, of bone, of any of the viscera, more especially if the onset of the attack has been sudden, the preparations of iodine must be depended upon for a cure of the symptom—often to the exclusion of mercury—and the drug must be pushed to the very utmost the stomach will stand, and rapidly pushed, if its full effect is to be obtained. After the iodine has done its work, when the symptom has yielded and the patient seems well, then mercury must be resumed at the "tonic dose," and continued for several months, at least, to seal the cure and prevent relapse.

It must be remembered, in giving the preparations of iodine, that they are quite apt to irritate the stomach, and that a less quantity will be of more service, the stomach being in good condition, than a greater quantity which disturbs digestion.

The iodides pass through the body promptly, and may be recovered in great quantity from the urine. It is during the passage through the blood that the curative influence is exercised. It has been argued that large doses are not necessary because the presence of iodine in the urine, when small doses are taken, proves that the blood is already saturated. This reasoning is theoretical. It cannot be accepted, since clinical experience shows that a very large dose of iodide is sometimes necessary to overcome a given symptom which a

smaller one will not touch, although the urine may show iodine clearly enough.

The fact is, that the kidneys must work actively, and rapidly eliminate the iodine which is put into the stomach, or the action of the drug is apt to be unsatisfactory, and some of the bad effects of iodine are liable to appear. When the iodides prove actively diuretic, then the tolerance of the patient is sure to be great and the good effects of the medicine marked. I am in the habit of asking patients who take the iodides whether they pass more than the accustomed amount of urine. If they do not, I add a diuretic to the solution of the iodide, such as infusion of digitalis in ounce-doses, or acetate or citrate of potash in half-drachm doses, or order the patient to take five to ten drops of the oil of juniper on a lump of sugar two or three times a day, and to drink plenty of water.

Among the bad effects of the iodides, the cutaneous eruptions produced by them are of the least importance, although they cause the patient to complain. Pimples, pustules of acne over the forehead, face, shoulders, buttocks, and sometimes quite generally over the body, may be brought out by a course of the iodides, especially if the dose be high. Reddened, scaly patches about the nose and on the face are less common. Purpura of the lower extremities may be caused by large doses. I have seen in one instance a distinct pemphigoid eruption (especially about the axilla and face), caused by the iodide of potassium. Hutchinson, of London, speaks of an acute bulbous eruption (hy

droa) as being not infrequently caused by iodide of potassium.

Generally the cutaneous symptoms may be greatly alleviated by frequent warm baths, and by causing the kidneys to eliminate the iodine promptly.

The acute catarrhal symptoms, sometimes produced by taking the iodides, may be relieved in the same manner, but often by reducing temporarily the amount taken; the patient becomes accustomed to the drug, and then his dose may be raised without his being disturbed by it. A little opium or belladonna internally seems to modify this effect. The subcutaneous injection of atropine, as for ptyalism (p. 44), might be tried. The symptoms may run so high that the drug has to be stopped.

The bitter taste of iodine in the mouth, especially strong on waking in the morning, cannot be overcome. A little mint-water or a mint-drop in the mouth masks it, as also does the chewing of licorice-root.

Sometimes the increase in the flow of saliva is great enough to amount to mild salivation. It is well, under these circumstances, to try to induce the kidneys to act freely.

Iodine may indirectly cause salivation when given freely after a mercurial course. It is believed to do so by rendering active mercury which has been lying dormant in the tissues. It is a very exceptionally rare occurrence.

Iodism is a general nervous irritation, with depresion (sometimes very extreme), caused occasionally in

individuals by the use of the iodide. A physician in this city informed me that even the contact of tincture of iodine with his fingers gave him symptoms of iodism. Another physician at one time could not touch the tip of his tongue to a bottle containing the iodide of potassium without having headache and nervous depression as a result. The affection in question is exceptionally rare. It may be combined with irritation of the cutaneous or mucous expansions, or occur alone. In persons having the idiosyncrasy, iodine cannot be used. The iodides seem more apt to cause it than iodine in tincture or solution. The characteristic feature of iodism is great nervous depression, with more or less headache, ringing in the ears, neuralgic pains in the bones, etc.

The direct irritation of the *primæ viæ* caused by the iodides is one of the serious obstacles to getting a full effect from the drug, to reach which perfect assimilation is necessary, without interfering with nutrition. This irritation manifests itself by loss of appetite, gastralgia, perhaps nausea, diarrhœa with griping, etc.

To avoid these bad effects, every precaution is necessary. The iodides should never be used in pill-form except when the dose is quite small (never more than five grains), and then the pill should be taken during or just at the close of a meal. Iodides are best taken two hours after eating, well diluted with milk or aërated water, or in milk to which some essence of pepsin or diastasic essence of pancreas has been added.

When the stomach happens to be especially irritable,

it is well to restrict the diet, cut off fruits, vegetables, and indigestible food. I found it necessary in one case to limit the patient to a diet of milk and rice before I could push his iodide sufficiently to master his symptoms. Bismuth-powders, or even a little opium, may be added to the course if necessary, and, where the stomach cannot be managed by any of these means, the rectum may be used for a time. Five or ten grain doses of iodide of potassium in an ounce of beef-tea, thrown into the rectum several times a day, rarely cause any complaint, for a time at least. The vapor of iodine may be inhaled, but I have not found it necessary to test this method therapeutically. Iodoform in suppository is not irritating, and the same substance is pretty well borne by the stomach. I have given half a drachm at a dose without irritating the stomach, but I am not yet convinced that any of the properties of the iodides are shared by iodoform, and cannot, therefore, recommend the latter in the treatment of syphilis.

All the bad effects of the iodides are seen most strikingly when the iodide of potassium is used. The iodides of sodium or of strontium are much better tolerated; but their therapeutical value is not quite so great as that of the iodide of potassium.

When the stomach objects outright, the compound tincture of iodine may be used in water or in starch-water (iodide of starch). I have not seen the latter disagree with the stomach, even after the iodides had proved very irritating. I have obtained fair results

from its use in thirty-minim doses, largely diluted with water, and have not had occasion to push it further. The tincture of iodine is certainly less efficacious than the iodides. The powdered iodide of starch may be given in thirty-, even sixty-grain doses. I have used metallic iodine, albuminate of iodine, iodide of ammonium, and iodide of calcium; but see no advantage in going outside of the first four mentioned—namely, iodide of potassium, iodide of sodium, iodide of strontium, and iodide of starch. With these, if iodine can be taken at all, I believe the requirements of any case may be met.

Ammonia in some form is often combined with the iodides in solution, under the idea (original, I believe, with Paget, who used the carbonate) that this addition intensified the power of the iodide with which it was combined. I have not been able to convince myself that this is so, although sometimes I have felt nearly sure of it. The combination, however, does no harm, and I often add one or two grains of the carbonate of ammonia, or the iodide of ammonium, to each dose of my solution of the iodide of potassium or sodium. Future observations will decide as to its real advantage.

The foregoing general remarks on the iodides and their uses are applicable wherever and whenever the drugs are employed, whether in combination with mercury or alone.

MIXED TREATMENT.

In the mixed treatment, the mercurial may be administered as inunction, or in fumigation, the iodide

being taken by the stomach, or both substances may be combined in the same formula.

An excellent combination, palatable and efficient, is the following. As written, the dose of the biniodide of mercury ($\frac{1}{16}$ of a grain) is a fair one for prolonged use. The quantity of mercury or of iodide of potassium may be varied at will, and one drachm of iodide of ammonium, or of the carbonate, may be added to the four ounces if desired. The iodide of sodium may be substituted for the iodide of potassium:

℞.	Hydrarg. biniod.,	gr. ij.
	Potassii iodidi,	ʒ ij.
	Syr. aurantii corticis,	℥ j.
	Tr. aurantii corticis,	ʒ j.
	Aquæ,	*ad* ℥ iv.

M. Teaspoonful in water after eating.

When a mild mixed treatment is to be long continued, it may be carried out in pill-form if the patient has a good stomach. Compressed pills (Dunton) are found in the shops, containing the biniodide of mercury and iodide of potassium in the proportion of $\frac{1}{20}$ of a grain to 3 grains, $\frac{1}{16}$ to 4, $\frac{1}{12}$ to 5, and (Chichester) $\frac{1}{20}$ to 5 grains.

It is more convenient, however, to have pills made as required in whatever proportions seem suitable, as—

℞.	Hydrarg. biniod.,	gr. iij.
	Potassii iodidi,	gr. cl.
	Gum-tragacanth,	q. s.
	Glycerini,	q. s.

M. Make into fifty pills.

The iodide of sodium may be substituted in the pill

for the iodide of potassium, and some reduced iron, or a minute portion of arsenious acid—especially valuable in long-standing and superficial infiltrations tending to become scaly—may be introduced into the pill, separately or together. Iron is indicated in anæmic conditions, and a little arsenic in such troubles of the integument as are peculiarly chronic and of the scaly type.

The mixed treatment is rarely given for any very prompt immediate effect. The more chronic troubles of intermediary and late syphilis call for it; and all the late lesions which are not frankly and simply pure gummata. The latter need no mercury.

When it is desirable to give one of the iodides at a fixed dose, it is well to administer it in solution in some bitter tonic, as—

℞. Potassii iodidi, ʒ ss.
Tr. cinchon. co., ʒ iij.
Teaspoonful, largely diluted in water, after eating.

Two grains of one of the preparations of ammonium may be added to each dose of this preparation, or gentian-tincture may be substituted for cinchona.

A very convenient way of giving the iodide, however, is as follows:

℞. Potassii iodidi, ʒ j.
Aquæ destillatæ, *ad* fl ʒ j.
M.

This is a saturated solution. The dose to commence with should be five or ten minims, and one or more minims may be added to each subsequent dose, accord-

ing to the rapidity with which it is desired to push the drug. Such a solution and a minim glass generally give the patient satisfaction. This minim dose, of course, must be largely diluted with water when taken. In the same manner a saturated solution of iodide of sodium may be used:

℞. Sodii iodidi, ʒ j.
Aquæ, *ad* fl ʒ j.

As already stated, iodine in tincture may sometimes be advantageously substituted for one of the iodides:

℞. Tr. iodinii comp., ʒ ss. to ʒ j.
Aquæ, ʒ j.
Teaspoonful, largely diluted with rice-water or simple water.

QUANTITY OF IODIDE WHICH MAY BE REQUIRED.

The limit to the amount of iodide which may be given to a patient depends upon its action. If all precautions are taken to keep the kidneys active and the skin free, and the dose is so managed that the stomach does not rebel, the drug may be pushed until the symptoms yield, and this they surely will do if they are of a gummatous nature. Under the kindly influence of iodine, unsparingly pushed, the node melts away, the gummy tumor becomes absorbed, the spreading ulcer blushes with healthy granulations, the palsied muscle regains its contractility, the veil drops from the clouded intellect, the maniacal paroxysm is followed by peace.

No means in the physician's hands place him so near the Deity as the iodide of potassium. With it, in

well-selected syphilitic cases, he can sometimes almost effect a resurrection. Wasted and lost functions are restored; the mind, the memory, the speech, the hearing, the sight, the taste, the touch—all may be recovered by its aid. The prognosis in the most desperate conditions is always infinitely better where syphilis can be made out as having caused the trouble, than where any other diseased condition is at fault; and no amount of destructive tertiary disease need occasion despondency, so long as the integrity of the stomach can be preserved and the physician is strong in his faith in iodine, and expert in his methods of using it.

I have often given an ounce a day of the iodide of potassium, and once within a few grains of three ounces a day with advantage. It is very exceptional, however, to give such large doses. Rarely is more than a drachm-dose necessary, and a half-drachm meets the full requirements of many cases. With iodine, as with mercury, every man has his own dose; and if the diagnosis be accurate, and the proper precautions in administration taken, the drug may be pushed indefinitely until the symptom yields. In all ordinary cases from three to five grains at a dose is enough to begin upon. In emergencies (hemiplegia, threatened loss of soft palate, mania, etc.) commence with twenty grains, and increase rapidly, adding five grains to the daily or even to the hourly dose if necessary.

Unfortunately, the iodide of potassium is an expensive drug, but it is the poorest kind of economy to buy it at a cheap store. In such cases it is generally a little

iodide mixed with a large amount of bromide of potassium which is bought.

DURATION OF TREATMENT BY IODINE.

The symptoms are what we treat with iodine, not the disease. Mercury modifies the disease, iodine cures certain symptoms; mercury tends to prevent relapse—not so iodine. Hence iodine need be given for the symptoms it controls; it should be continued during the existence of the latter, and for some weeks—possibly months—afterward (according to the severity and chronicity of the symptoms), and then gradually dropped, while mercury, which should be given with it toward the end, is continued.

OTHER MEANS USED IN THE GENERAL TREATMENT OF SYPHILIS.

The different preparations, extracts, decoctions, etc., of the woods, are of some service as tonics and adjuvants during a course of general treatment, but have no specific value. Guaiac and sarsaparilla are the best: the former is more fitting to be used with mercury; the latter, while iodide of potassium is being taken. Sulphur as a curative agent has, I think, no value. A course at a sulphur-spring is believed by some to be able to decide whether the patient in a given case is cured of syphilis or not; the idea being that, if any syphilis remains, the sulphur-bathing will cause it to appear. This test is not reliable in late syphilis, when it is most needed. The irritation of a sulphur-bath

will often call out an eruption upon a patient suffering from syphilis early in the disease, but later along he may be manifestly suffering from visceral syphilis, and still show nothing new after sulphur-baths. As for the alleged power of sulphur to "get mercury out of the system," I consider it purely hypothetical.

Zittman's decoction (the stronger), of which the formula may be found in the United States Dispensatory, is a remedy of undoubted power. It is, roughly speaking, a decoction of sarsaparilla and senna made aromatic, and containing a little mercury. In very obstinate cases of late syphilis, especially the ulcerative form, where there is a tendency to cachexia and no appetite, large doses of this decoction up to a pint a day or more, so as to produce pretty free catharsis, will often give the patient a decided turn for the better. It may be used tentatively for a while, when the standard remedies seem to lose their power.

Syphilization as a cure for syphilis has been judged by the profession of the present day. It is based on a misconception, and its use with private patients is impracticable.

The Hot Springs of Arkansas are vaunted for their power to eradicate syphilis. This claim is utterly unfounded in fact.[1] The eruptions do disappear at the

[1] One of the physicians from the springs, recently on a visit to New York, informed me that he did not claim for the springs any power to do away with syphilis, but always gave mercury moderately and iodide of potassium in connection with the waters. He stated, however, that the general influence of the waters was tonic and reconstituant, and that all forms of syphilis did much better under their use than when treated without them.

Hot Springs, and many of the more chronic and inveterate cutaneous lesions are promptly removed by a course of the baths, but relapses occur just as after other forms of treatment, and the great disadvantage of the springs is that they encourage false hopes. Most of the physicians at the springs, I find, use mercury and the iodides in excess upon the patients who are taking the baths.

The exact value of these springs has not yet been scientifically established. It is to be hoped that some of the physicians now upon the spot will make a thorough study of the subject and report it to the profession. Such a report would doubtless be of great value.

GENERAL TREATMENT OF PREGNANT SYPHILITIC WOMEN.

When a woman known to have active syphilis becomes pregnant, the chances of abortion or miscarriage are very great. In many cases a careful mercurial treatment will avert such a catastrophe.

It is proper to treat all cases of pregnancy in syphilitic women with mercury, and with mercury alone, so far as the pregnancy is concerned, although for her own special symptoms the mother may require iodine. None of the preparations of iodine, however, seem to possess any value in averting abortion.

The obstacle to treatment in a pregnant woman is the condition of the stomach, which for many months in most women (sometimes during the whole of pregnancy) is capricious, irritable, liable to spontaneous nausea, and otherwise unfit for the introduction of

medicine. In a given case if the stomach happens to be perfectly good, mercury may be given by the mouth —preferably in the form of blue-pill combined with iron. The "tonic dose" is too small to be relied upon; the "full dose," if maintained throughout pregnancy, would be debilitating to mother and child. It is better, therefore, to use a little more than the "tonic dose," adding, perhaps, one-third of the "reserve dose" (p. 30). This may be safely maintained throughout utero-gestation.

In a great majority of all cases, however, no accurate dosing by the stomach can be followed out, and inunction must be relied upon. It should be steadily continued throughout pregnancy, but never pushed to the point of salivation.

GENERAL TREATMENT OF INHERITED SYPHILIS.

All the earlier symptoms of inherited syphilis yield, if they do so at all, to mercury. The bone-lesions, and some of the visceral lesions, do better when the iodides are used at the same time with the mercury, but the latter is indispensable in all cases. The stomach of the nursing baby cannot be depended upon, for vomiting is nearly as natural to it as swallowing, and it is impossible to regulate the dose; therefore inunction must be resorted to for babies. Young babies do not seem liable to become salivated, and the only caution required in treating them by inunction is a care that their delicate skin does not become irritated by the

ointment employed. This may be avoided by frequent inspection, and plenty of soap-and-water.

Inunction in babies is best performed by smearing the flannel belly-band with ointment or oleate, and keeping it constantly applied until the skin commences to show irritation. The soles of the feet, unless rawed by excoriations or pemphigus, may be bound up in the oleate. Bandages may be wrapped also around the knees and elbows, the constant motions of the child tending to work the mercury into the skin. Should the infant get considerable diarrhœa, the inunctions may be intermitted temporarily.

Grey powder by the stomach is often used for infants. I greatly prefer bichloride of mercury in watery solution, giving one one-hundredth of a grain at a dose very often repeated. I have given such a dose hourly, night and day, for many days successively, with the very best effect. It may be mixed indifferently with milk or any food. Infants tolerate mercury better than adults.

CHAPTER III.

THE LOCAL TREATMENT OF SYPHILIS, AND THE ESPECIAL MEANS ADAPTED TO SPECIAL LESIONS.

Local Treatment of Chancre. — Of Syphilitic Phagedena, of Bubo. — Of Lesions of Mucous Membranes.—Of Cutaneous Lesions.—Of Lesions of the Eye, the Ear, of Muscles, Joints, Bones.—Visceral and Nervous Syphilis.

CHANCRE.

THE *infecting chancre* is often so trifling a lesion that it almost escapes notice, but it may possess all shades of severity up to gangrenous phagedena. It is not necessary to burn an infecting chancre. Some of the milder forms seem to heal more promptly after being cauterized, but the patient has syphilis none the less. In point of fact, the patient has already had syphilis for many days before his chancre appeared. Did he not have syphilis, he could have no chancre. Assuredly the chancre does not give him syphilis, but syphilis gives him the chancre, and destroying the latter on its first appearance cannot destroy the disease. This has been clinically proved in many instances (Hill, Diday[1]), and incidentally is being constantly demonstrated by those patients whose infecting chan-

[1] Van Buren and Keyes's "Genito-Urinary Diseases, with Syphilis," pp. 509. New York: D. Appleton & Co., 1874.

cres are cauterized under the idea that they are chancroids—or whose chancres are excised. These patients have their syphilitic eruptions in due time, and the cauterization generally fails to do the chancre any good. Mixed chancres should be thoroughly cauterized, as though they were chancroids.

Mild chancres may be dressed with dry lint, or a little vaseline, or some slightly-astringent wash, as—

℞. Vini aromatici, ℥ ss.
Aquæ, ℥ jss.
M.

Or a soothing lotion—

℞. Liq. plumbi subacetatis dil., q. s.

These are used by soaking a thin piece of linen in them, and applying it so as to keep the raw surface from contact with the surrounding parts (as in subpreputial chancre). Or powdered oxide of zinc may be dusted over the surface in addition to the use of one of the lotions, or thioform used freely, or some other modern antiseptic powder. Such means as these are advisable so long as there is the least possible doubt of the nature of the sore. When that doubt ceases and internal treatment can be commenced, the chancre heals with charming rapidity under the internal use of mercury without demanding any aid from local measures. But a local mercurial will assist its disappearance even under these circumstances. Among the best to use are—

℞. Lotio nigr., q. s.
Shake before applying.

Or, what amounts to the same thing—

℞. Hydrarg. oxid. nigr., q. s.
To dust over the sore.

Or—

℞. Hydrarg. chlorid. mitis, q. s.
To use in the same manner.

Or any of the mercurial ointments recommended for syphilitic ulcers (page 71). Should *phagedena* attack the chancre, it should be cauterized thoroughly with nitric acid, or the red-hot iron, or both, and then allowed to scab, or be dressed with vaseline, or lead-lotion, or balsam of Peru. Tonics should be given meantime internally, and the "tonic dose" of mercury used—*even in phagedena, if an accompanying eruption proclaims the chancre to be syphilitic, but not otherwise.* Phagedena destroys induration, and masks all the physical characters of the syphilitic chancre. Chancroid is far more subject to phagedena than is chancre, and the proof of syphilis must exist in the form of a characteristic eruption before it is allowable to give mercury for phagedena.

SYPHILITIC BUBO.

The indurated indolent ganglia of syphilis, when of moderate dimensions, do not call for local measures. If they threaten suppuration, as they occasionally do, rest and light poultices, with tonics and good food, afford the best means of combating this complication. Tincture of iodine is of little or no value. I have sometimes thought that I have averted suppuration by keeping a freshly-made belladonna-plaster constantly

over the bubo. Should suppuration occur, the abscess is to be treated on general surgical principles.

In those uncommon cases where the bubo becomes inordinately large, with no tendency to suppurate, tincture of iodine locally is of some service in promoting resolution. Assistance can be found in a mercurial plaster or oleate of mercury to the skin, rest to the body, and pressure by a bag of shot or sand, or dry compressed sponge (afterward moistened) under a tight bandage. A blister over such a surface will sometimes start absorption, or touching a red-hot iron twenty or thirty times lightly to the skin over the hardened mass, or multiple puncture into the substance of the gland with a needle. It rarely becomes necessary to extirpate these large masses, as they gradually melt away under general treatment if local means fail. I have seen masses as large as the fist perfectly indolent in the groins of both sides, and occasioning enormous œdema of the scrotum and penis. Such lumps sometimes call for active surgery. Interstitial injections of iodine or electrolysis might be tried.

LOCAL TREATMENT OF LESIONS OCCURRING UPON MUCOUS MEMBRANES.

Mouth-lesions of every description require cleanliness in their treatment. The use of tobacco in any form is injurious.

Erythema.—The early sore-throat of syphilis is largely erythematous. The hyperæmia may run high, and the attack resemble a bad sore-throat. It yields

to general (antisyphilitic) treatment; but local remedies give the patient great comfort—such as gargling with a solution of mercuric bichloride 1 in 8,000—in very bad cases, steaming the throat. The following is useful and soothing:

℞.	Codeiæ,	gr. ij.
	Potass. chlorat.,	ʒ ij.
	Infus. lini. co.,	℥ iij.
	Syr. tolu,	℥ j.

M. S. Tablespoonful every two hours.

Ulcers, if acute and superficial, require only a continuance of the means just suggested. In addition, they may be touched once a day with a very mild solution of nitrate of silver, five or ten grains to the ounce.

Chronic ulcers, however, with brawny, livid, indurated margins and base, where the bottom is either without granulations, or covered with a dirty, whitish pellicle—ulcers, I mean, which are not gummy, not advancing rapidly, but such ill-looking, sluggish, often painful, chronic ulcers, as are found in intermediary and late syphilis on the back of the fauces, on the tonsils, on the sides, tip, or top of tongue, inside the cheeks, or at the angles of the lips—these varieties of ulcer require active local treatment in combination with internal (preferably mixed) treatment for their relief. Mouth-washes, care of teeth, chlorate of potash, etc. (page 44), are all useful.

The local applications most effective upon these ulcers are, in their order of efficiency, acid nitrate of mercury, nitrate of zinc, and nitrate of silver. Acid

nitrate of mercury is best applied with an old-fashioned wax bougie. A wooden rod holds hardly enough, while a drop is apt to fall from the end of a glass rod should the latter be used; and, if such a drop falls into the fauces, the suffocative paroxysm caused by it is very distressing. Acid nitrate of mercury gives considerable pain, and it is best not apply to it to very extensive surfaces. The ulcerated surface may be touched lightly with it every four to five days until the granulations look healthy.

Nitrate of zinc is next in excellence, and stands next in the amount of pain it produces. The pain varies; some patients complain but little, others are extravagant in their expressions of discomfort. The nitrate of zinc can now be bought in sticks covered in with paper. The sticks I find apt to deliquesce in warm weather, and should be kept in tightly-corked bottles. To make an application, the solid stick is rubbed pretty actively over the whole surface. The size of the latter makes no difference.

Nitrate of silver, in solid stick or solution, may be used instead of the foregoing remedies, but is much less serviceable.

Finally, local mercurial fumigations are of service for ulcerated, mucous, or scaly patches in the mouth or throat where the fumes of calomel can be inhaled without provoking cough. This local fumigation is very easily performed. The tin table and lamp (Fig. 3, p. 40) are used. From a quarter to two grains of calomel, mixed with an equal quantity of powdered chalk

to prevent too rapid volatilization, are spread upon the tin table, the lamp lighted, and the fumes inhaled with open mouth, or through the apex of a slightly-trun cated newspaper cone held over the ascending fumes.

Gummy ulcers, those resulting from an ulcerated gumma, or the serpiginous, gummy ulcer of the fauces, which is visibly spreading from day to day, with a yellowish, pultaceous base and border, and a brightly livid red line between this border and the healthy parts—these ulcers require no local treatment. All energy and attention bestowed upon them locally is wasted. Cauterization cannot be relied upon to arrest them, and whatever tissue is destroyed by cauterization is so much more loss to the patient. Chlorate of potash, cleanliness, steam, and local fumigation, may do some good; but the one and only thing to do in an emergency like this—for a destructive ulcer of the fauces in an emergency—is to push and crowd a suitable iodide vigorously, and to bestow all care and attention upon the stomach, that the patient may assimilate his drug in a kindly manner. The reward is visible, and the charm of seeing such an ulcer flush with healthy granulations, and of daily watching the epithelium almost skim before the eyes over the surface, is rarely surpassed in medical experience.

Mucous and Scaly Patches.—These are the bugbear of the patient and the torment of his adviser. They come early in syphilis, and stay late, cropping out long after all other symptoms seem to have been subdued. The hygiene of the mouth and care of the teeth are

most important in this connection. A rough angle of a projecting tooth, or a persistence in chewing or smoking tobacco may baffle the best-directed and most intelligent efforts, local and general, for the removal of these pests. This the patient should be made distinctly to understand, and his complainings should be turned against himself if he fails to do his part toward keeping his mouth in order.

The special local means adapted to the treatment of mucous and scaly patches are the same as those for chronic ulcers, less vigorously applied. It is not often necessary, however, to resort to painful topical applications like the acid nitrate of mercury, or nitrate of zinc; and a large crystal of pure sulphate of copper is cleaner and less disagreeable than nitrate of silver, and found to answer about as well in ordinary cases as its more powerful rivals. The patient may be instructed to touch his mucous or scaly spots lightly once or even twice a day with a smoothed lump of sulphate of copper, and under the stimulation the patches will generally improve.

Lesions of the mucous membrane of the nose are treated on the same general principles as those of the mouth and throat, by fumigations and topical applications. In babies with inherited disease, who have the snuffles, the nose may become so blocked up with scabs and mucus that nursing is interfered with. Syringing with warm soap-suds and anointing the nostrils thoroughly with vaseline, will be of great assistance in these conditions. In late syphilis, where the bones of the

nasal cavities have been diseased, portions of dead bone, not yet separated, or inclosed partially in healthy involucrum, keep up offensive discharges and maintain ulceration. The removal of the offending bone can alone effect a cure in these cases; douching and syringing with carbolic acid and permanganate of potash solutions are only palliative.

LESIONS OF THE VAGINAL AND ANAL MUCOUS MEMBRANES AND THEIR VICINITY.

Mucous patches and ulcers of the vagina are managed on the same general principles as those of the mouth. When these lesions, however, are situated about the orifice of the genital passages in the female, or about the anus, scrotum, and under the prepuce, in the male,[1] they are always bathed in an offensive moisture, and apt to vegetate, to be surrounded by groups of flat condylomata, and clusters of vegetations—so-called venereal warts.

In the treatment of such patches of complex disease, the first requisite is disinfection. The parts must be washed with Labarraque solution diluted with five or six parts of water, or with water deeply tinted with permanganate of potash. Then they should be thickly dusted with pure calomel, or calomel and iodoform in equal parts, and some old linen, or absorbent cotton, or oakum tucked in between the overlying portions of skin, so that the affected surfaces may be shielded from

[1] And to a certain extent when mucous patches occur between the toes.

all adjoining parts. The dressings should be renewed two or three times a day or more, according to the severity of the case, and prompt improvement is pretty certain to follow. In addition to these measures, applications of nitrate of zinc, nitrate of silver, etc., may be made with advantage.

Old, indurated, indolent ulcers require active cauterization or excision.

LOCAL TREATMENT OF CUTANEOUS LESIONS.

The earlier eruptions due to syphilis are, for the most part, scattered over the whole body. Local treatment is unnecessary; when portions of these eruptions or groups of lesions later in the disease appear upon the face or hands, patients become urgent in their demands for some local application to remove the sign which, they seem often to believe, heralds their malady to the world.

Local applications are of very positive value in cutaneous lesions of all sorts—the congestive and the hyperplastic as well as the scaly and the ulcerative. It is needless to detail each lesion and the local application especially suited to it; suffice it to say, the more chronic the lesion, the more tissue-change there has been, the stronger, the more stimulating may be the local application—so long as the skin remains unbroken. With ulcers the strength of the ointment must be modified according to the sensations of the patient. These remarks apply also to the cutaneous lesions of inherited disease.

The following ointments will be found of service where the skin is unbroken:

℞.	Hydrarg. oleat.,	5 per cent.
Or—		
℞.	Hydrarg. ammoniat.,	ʒ j to ʒ ij.
	Vaseline,[1]	℥ j.
Or—		
℞.	Hydrarg. oxid. rub.,	ʒ ss to ʒ ij.
	Vaseline,	℥ j.
Or—		
℞.	Ungt. hydrarg. nitratis,	q. s.
	To be used pure, or diluted one-half.	
Or—		
℞.	Hydrarg. iodidi,	gr. xx to xl.
	Vaseline,	℥ j.
Or—		
℞.	Hydrarg. oxid. flav.,	gr. xx to ʒ j.
	Vaseline,	℥ j.

I have used all these preparations largely. The oleate and white precipitate I use most upon erythematous lesions and the papular syphilide—the citrine and yellow oxide on scaly and tuberculated patches, the red precipitate and green iodide where the others do not seem to act promptly.

For ulcers and patches of rupia deprived of their scabs, the local remedies are the same as above. Their application should not produce pain, although several of them do so in many cases if they are put on at full strength, so that they may require dilution at first for special cases. Among the above ointments I find the nitrate of mercury (half strength) and the iodide of

[1] Simple benzoated cerate, lard, cold cream, or other substance, may replace the vaseline. The latter never becomes rancid.

mercury (full strength as given) to be most serviceable in cases of ulceration.

An excellent local effect upon ulcers may be produced often by sprinkling them with iodoform or black oxide of mercury, or calomel, alone or combined with oxide of zinc, and perhaps containing a little camphor.

Syphilitic ulcers must receive surgical attention also. If sloughs adhere upon their surface, they may be removed with the yeast-poultice. Balsam of Peru, with strapping and tight bandaging, will greatly assist the cicatrization of ulcers on the leg when the circulation is defective, varicose veins exist, etc.

When the edges of a chronic syphilitic ulcer are livid and indurated with irregular granulations (or perhaps with none at all), the whole aspect of the sore may be changed by freely incising the hardened edges and poulticing for a few days, or by encircling the ulcer with a deep incision at about half an inch from its edge, the incision to reach well down to the deep fascia all around. Such an incision may be then packed with lint or oakum and the whole part bound up under pretty firm pressure until suppuration sets in.

When an ulcer is peculiarly indolent, indurated, and chronic, new activity may be excited in it by packing it full of crystals of acetate of soda. The application produces considerable pain, lasting often several hours. It makes a superficial, filmy slough, but has a charming effect in freshening up a sluggish surface. A somewhat similar stimulating influence is exercised

by solutions of chloral upon unhealthy and sluggish ulcers, as—

℞.	Chloral hydrate,	gr. v–xx.
	Aquæ,	℥ j.
	M.	

Lint, soaked in this solution, is packed into the ulcer. If the solution is stronger than five grains to the ounce, it causes considerable pain; but the pain does not usually last long, and the applications, as a rule, need not be continued more than two or three days before the bottom of the ulcer clears off and assumes a fresh, bright appearance, showing itself ready to advance toward cicatrization alone, or by the help of some ordinary local measures.

When dead bone not yet separated exists at the bottom of an ulcer, it may be touched daily (if it is in plain sight) with sulphuric acid. Where it exists partly covered with granulations, or at the bottom of a sinus, or in a cavity, injections of one part of acid to six, or even three, of water may be used without doing violence to the granulations, or causing appreciable pain, while at the same time the solution is strong enough gradually to dissolve away small portions of bone.

LOCAL TREATMENT OF LESIONS OF THE EYE.

When any inflammatory lesions occur upon the conjunctiva, besides the general treatment, it is rarely necessary to do more than bathe the eye frequently in warm water, shield it from the light, and instill into it,

several times a day, a few drops of the following, for the soothing influence which it exercises:

℞.	Atropiæ sulph.,	gr. ij.
	Aquæ destill.,	ʒ j.
	M.	

When the cornea is involved, the same local means may be called for if the eye becomes red or painful.

Iritis.—This requires pretty active mercurialization for its prompt relief—preferably by the bath. Gummy exudation in this region is also generally very favorably influenced by mercury. The atropine solution should be used with the utmost freedom in all cases where the iris is involved. A mixture of twenty per cent. oleate of mercury in belladonna-ointment, two drachms to the ounce, may be rubbed over the brow of the affected side. Morphine locally or internally may be required for pain.

The deeper lesions of the eye require no local treatment. If there be pain about the eye, the instillation of atropine may be soothing, but internal treatment, mainly mercurial, can alone be relied upon to effect any positive improvement.

LOCAL TREATMENT OF LESIONS OF THE EAR.

Syphilis of the ear does not call for any local measures except such ordinary surgical means as naturally suggest themselves. The subject is only mentioned to call attention to those rare cases of sudden deafness occurring in acquired syphilis, evidently due to nerve-lesion and not attended by any local symptoms what-

soever. The general treatment I have found of service in such cases is the daily mercurial bath and large doses of the iodide rapidly pushed to the limit of tolerance. A very satisfactory result was reached in an extreme case of this sort which I recently saw in connection with Prof. Roosa.[1]

LOCAL TREATMENT OF SUBCUTANEOUS LESIONS, MUSCULAR AND JOINT AFFECTIONS, NODES.

Lesions coming under these heads are either purely gummy, or partake more or less of a gummatous nature. Their general treatment is the iodides, pure, or the mixed treatment with the iodides in excess. There is no doubt but that sometimes decided advantage may be derived in these lesions by combining local inunction of one of the oleates of mercury with the internal treatment.

VISCERAL SYPHILIS.

Lesions of the viscera rarely require any local treatment, being for the most part too deeply seated to be influenced by it. They generally call for mixed treatment with the iodides in excess, especially if the lesions give rise to active functional disorders. After the latter have subsided the quantity of iodide may be reduced, and the whole treatment terminated by a prolonged mild mercurial course. Even in orchitis I do not find local inunction of any appreciable service.

When the testicle is the seat of a distinct gumma, the iodide alone will control it, but the more the lesion

[1] *New York Medical Record*, November 18, 1876, p. 748.

approaches the diffuse parenchymatous type (that form giving the smooth, hard, woody, insensitive enlargement of the testicle), the more is mercury needed and the less will iodine accomplish. The less the lesion partakes of the nature of gummy tumor, the more chronic is its course apt to be. The same remark holds good of all other visceral lesions. If from the rapidity of the onset of the symptoms, or by physical signs or otherwise, a diagnosis of visceral gumma can be established, an unsparing use of the iodides is called for—otherwise the mixed treatment, with iodide in excess, and finally a pure mercurial tonic course. The visceral lesions of children, when they yield, do so to mercury.

Of nervous symptoms the same remarks hold good: a lavish use of iodides is called for by acute symptoms, mixed treatment for the more chronic forms, gradually tapering down to a pure mercurial tonic course.

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